

WHAT IS CLAIMED IS:

1 Apparatus for processing products for increasing the density of
2 particulate matter in a powderized form comprising:

3 feed means for directing particulate matter into a pelletizing mill, the
4 particulate matter being in a first powderized form and having a first density;

5 a pelletizing mill for generating pellets of the particulate matter; and

6 means for milling the pellets into a second powderized form, whereby
7 the second powderized form of the particulate has a greater density than the first
8 density.

1 2. Apparatus as claimed in claim 1 wherein the formed pellet
2 substantially excludes diluents or fillers.

1 3. Apparatus as claimed in claim 1 wherein the formed pellet
2 substantially includes diluents or fillers.

1 4. Apparatus as claimed in claim 1 including means to introduce steam
2 into the pellet mill during the formation of pellets.

1 5. Apparatus as claimed in claim 1 wherein the products include
2 materials for at least one of a pharmaceutical, nutritional or herbal end product.

1 6. Apparatus as claimed in claim 1 including means for applying
2 saturated steam at a selected temperature and pressure and condensation characteristic
3 to the pellet mill during pelletization thereby to increase the moisture content of the
4 product.

1 7. Apparatus as claimed in claim 6 wherein the product with increased
2 moisture content is forced under pressure through a spinning perforated dye of a

3 predetermined dimension thereby to obtain a pellet of a selected size, the forcing
4 through the dye being effected selectively by counter rotating roller means.

1 8. Apparatus as claimed in claim 7 including means to cool the pellets to
2 a substantially ambient temperature prior to being milled by the milling means.

1 9. Apparatus as claimed in claim 1 including pre-milling for processing
2 raw materials to obtain a particulate matter for feeding into the pelletizing mill.

1 10. Apparatus as claimed in claim 1 wherein the size of particulate in the
2 first form is in a range of about 150 to about 250 microns.

1 11. Apparatus as claimed in claim 1 wherein the pelletizing mill includes a
2 conditioning chamber, and wherein the particulate material in the conditioning
3 chamber is penetrated by at least about 95% substantially pure saturated steam under
4 a pressure of about 40 to about 80 PSI at about a temperature of about 180°F to about
5 400°F thereby to hydrate the particulate matter at a temperature of about 80°F to
6 200°F and thereby add about 1% moisture to the particulate matter.

1 12. Apparatus as claimed in claim 11 including a cooler at an outlet from
2 the pelletizing mill, the cooler being for permitting ambient air to pass through a bed
3 containing pellets discharged from the pelletizing mill.

1 13. Apparatus as claimed in claim 1 wherein the milled pellets output in a
2 powdered form has an approximate size between about 100 to about 1300 microns,
3 or of a size where about 100% of the powdered product is passable between a 14
4 mesh to a 150 mesh.

1 14. Apparatus as claimed in claim 1 wherein the powdered form of the
2 milled product has a particle size permitting about 100% passage through a 60 to 80
3 mesh.

1 15. A product produced by the apparatus of claim 1 wherein the
2 powdered form of the product is relatively denser, or coarser, or capable of
3 improved flow with less dust or relatively more compressible than the particulate
4 matter.

1 16. A product produced by the apparatus of claim 1 including means for
2 forming the output product in the second powdered form into, selectively, tablets,
3 capsules, or powder blends and selectively with at least one other ingredient.

1 17. A product produced by the apparatus of claim 1, wherein a
2 powdered product in the second form has relatively greater granularity than the
3 particulate matter in the first form.

1 18. A method for processing products for increasing the density of
2 particulate matter in a powdered form comprising:
3 forming pellets of the particulate matter, the particulate matter having
4 a first density; and
5 milling the pellets into a powdered form, whereby the powdered
6 form of the particulate in the second format is a greater density than the first density.

1 19. A method as claimed in claim 18 wherein the formed pellets
2 substantially exclude diluents or fillers.

1 20. A method as claimed in claim 18 wherein the formed pellets
2 substantially include diluents or fillers.

1 21. A method as claimed in claim 18 including selectively introducing
2 steam into the product during the formation of pellets.

1 22. A method as claimed in claim 18 wherein the products include
2 materials for at least one of a pharmaceutical, nutritional or herbal end product.

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1 23. A method as claimed in claim 18 including means for applying
2 saturated steam at a selected temperature and pressure and condensation characteristic
3 during pelletization.

1 24. A method as claimed in claim 23 including forcing the product with
2 increased moisture content under pressure thereby to obtain a pellet of a selected size.

1 25. A method as claimed in claim 24 including cooling the pellets to a
2 substantially ambient temperature prior to milling.

1 26. A method as claimed in claim 18 including conditioning the particulate
2 material thereby to cause penetration by at least about 95% substantially pure
3 saturated steam under a pressure of about 40 to about 80 PSI at about a temperature of
4 about 180°F to about 400°F thereby to hydrate the particulate matter at a temperature
5 of about 80°F to about 200°F and thereby add about 1% moisture to the particulate
6 matter.

1 27. A method as claimed in claim 18 including cooling the pellets by
2 passing ambient air through a bed of discharged pellets.

1 28. A product produced by the method of claim 18 wherein the
2 powderized second form is denser, relatively coarser, capable of improved flow with
3 less dust, or relatively more compressible than the particulate matter in the first
4 format.

1 29. A product of claim 26 including forming the powderized second form
2 of the product into selectively tablets, capsules, or powder blends and selectively
3 adding at least one other ingredient.

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